

Trip Report  
Chiapas, Mexico  
May 15 – May 24, 2007

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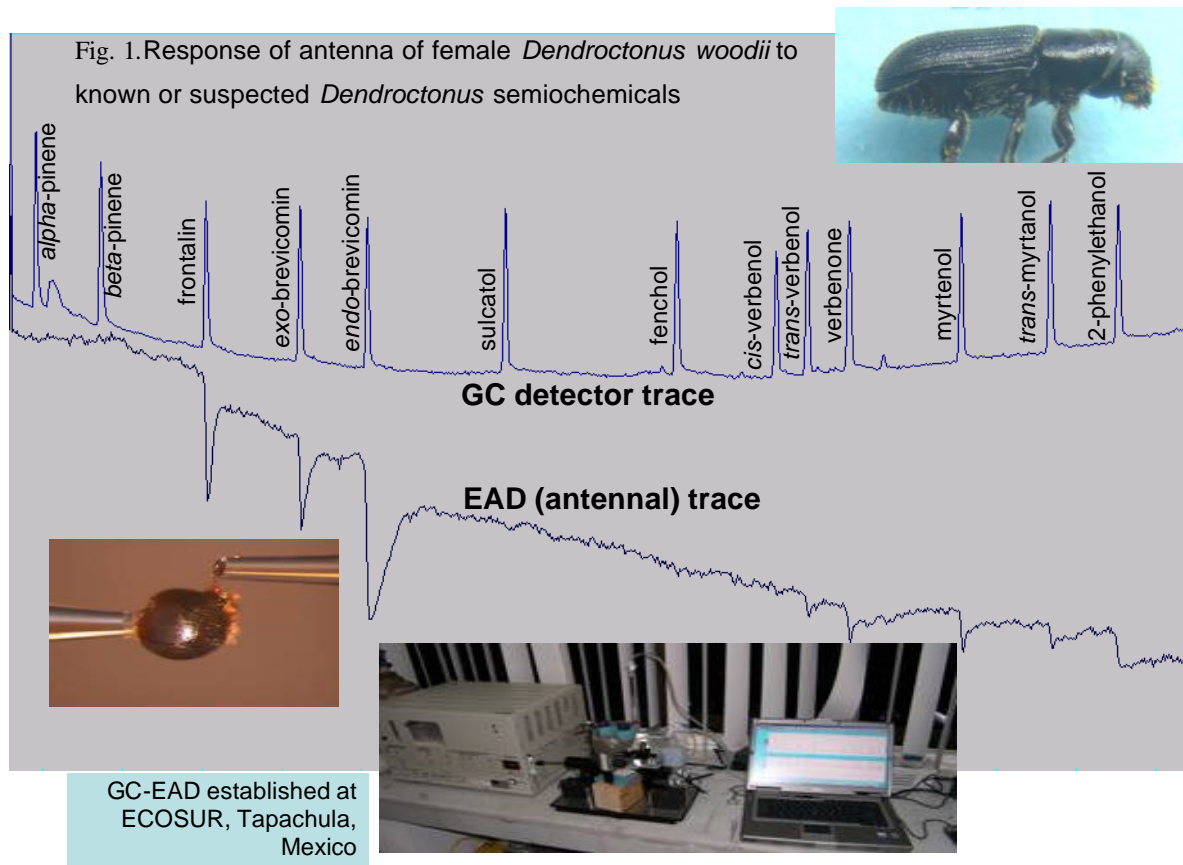
A putative new species of *Dendroctonus* bark beetle has been identified in Mexico and Central America. The new species tentatively has been given the scientific name *D. woodii*, though an official description of the species has yet to be published. This species, along with the southern pine beetle (SPB) *Dendroctonus frontalis*, has been implicated in the bark beetle outbreaks that plagued the region in the late 90's and early 00's. Some entomologists believe this new species was a primary factor in the outbreaks, acting in a manner similar to the aggressive SPB. Other entomologists suggest it functions as a secondary bark beetle, and that SPB initiated the infestations and outbreaks. Preliminary field trials indicated the new species was not readily captured in traps baited with the primary attractants used for collecting SPB: frontalin and turpentine. This species has the potential for spread or import into the United States. A cooperative project between the USDA Forest Service, the Texas Forest Service, and El Colegio de la Frontera Sur ECOSUR was developed to study the ecological role of the new species and identify potential pheromones or other attractants that could be used in surveys and management. I traveled to Tapachula in Chiapas, MX with Brian Sullivan of the Southern Research Station to continue work on the project.

Our visit was hosted by Jorge Macías-Sámano of ECOSUR. Jorge currently has two graduate students working with the new species: Alicia Niño and Benjamín Moreno Castillo. Alicia is working to identify potential attractants for the new species, while Benjamin is testing attractants in the field and examining the beetle life history. Brian spent the first two days with Alicia working on the GC-EAD. We also attended a seminar by Regina Gama, another graduate student. Her work focuses on the transformation of  $\alpha$ -pinene by yeast in the midgut of *Dendroctonus valens*. We also planned the field work and loaded supplies.

On May 16 we traveled to the field site in Lagos de Montebello National Park, near the city of Comitán. The Park is primarily a pine forest, and the two main species

are *Pinus oocarpa* and *P. maximinoi*. Both species are susceptible to *Dendroctonus* infestation, and SPB and the new species had been active there in previous years. Park personnel had been very accommodating with previous studies and were interested in ideas on reducing the impacts of bark beetles. I discussed management strategies with the forest health specialist for the Park. We established several studies during our visit.

**Pheromone composition of the new species.** We located infested trees with either attacking or emerging adults of the new species and collected attacking adults or the infested bark with emerging beetles. The bark was placed in emergence cages or in nylon pillowcases to allow for emergence. Some of the beetles collected were used for GC-EAD studies to identify response to *Dendroctonus* semiochemicals (Fig. 1). Other adults were placed in conical vials containing Porapak to collect and identify the pheromones produced. Brian returned to Tapachula on May 21 to work with Alicia on these studies.



**Within tree distribution of SPB and the new species.** Several infested pines were felled and cut into 1 m bolts. The bark was removed and all bark beetles excavating galleries were collected. Initial results suggest that SPB were present throughout the entire bole, while the new species primarily infested the lower 3 m. The two species are difficult to separate without using a microscope. The new species has striations along the anterior edge of the pronotum, while SPB does not. SPB are generally between 2.5 and 4 mm in length, while the new species is somewhat larger, ranging between 3 and 5 mm. The gallery patterns appeared similar, with some S-shaped as seen in the southern U.S. and some more horizontal. In contrast to observations in the southeastern U.S., the beetles often scored the wood when constructing galleries in Mexico.

SPB often attack the mid-bole first, so brood stages are more advanced in comparison to the lower bole. In Honduras, initial attacks commonly occurred just beneath the crown, with the lower bole attacked later. There were no evident differences in brood stages between lower and mid-bole in Chiapas, indicating that the entire tree was attacked at approximately the same time. This could be a function of the tree species attacked, the population level of the beetles (high), the elevation, or other factors. More work is needed to understand the pattern of attack. It still appears likely that SPB initiates the attack and is followed by the new species, but this sequence of infestation must be verified.

In hardwood areas near the pines, a baited trap was hung from a tree branch ca. 7 m high, and another trap was hung underneath it from a metal pole with the collection ca. 1 m from the ground. The number and species of beetles collected will be recorded.

**Attractant studies.** Two trapping studies were established to test potential attractants for the new species. In the first study the treatments were:

1. Blank
2. Standard attractant (SA) = frontalin (2 tube pouch from Chemtica), racemic endobrevicomin (low release bubblecap from Chemtica), and turpentine eluted from a wicked bottle.
3. SA + ethanol (polyethylene bottle with holes near cap)

4. SA + exobrevicomin (Chemtica pouch)
5. SA + 2-phenylethanol (.5 cm capillary)

The standard attractant was so designated as it is now commonly utilized in surveys for SPB.

The second study evaluated alterations in the standard attractant for collecting SPB and the new species. The five treatments were:

1. SA
2. (+) endo-brevicomin (capillary) replaced racemic endo-brevicomin
3. low release turpentine (small wicked vial) replaced turpentine bottle
4. high release racemic endo-brevicomin (Chemtica pouch) replaced endo-brevicomin bubblecap
5. Same as 4 except low-release frontline vial replaced frontaline pouch

Each study had two replicates, with the treatments re-randomized daily with no replacement. Collections were made daily. Traps were spaced at least 100 m apart to preclude any interference between attractants. Due to these spacing requirements, it was difficult to find large openings in which to place the traps. Most were placed in smaller openings, with the nearest pine at least 4 m away (Fig. 3).



Fig. 3. Funnel trap, Lagos de Montebello National Park

Initial results indicated lowest trap catches in treatments with the low release frontalín or with ethanol. No species separation has been done to date. By the fourth day, spillover attacks were evident on adjacent trees. Most attacks were to the west and north of the traps. Spillover attacks ranged from very high (multiple trees with numerous attacks), to moderate (one or two trees with several attacks), to slight (one or two trees with one or two visible attacks). Only 4 trap locations had no spillover attacks, and only one of these was in a very open area with no pines within 10 m.

These spillover attacks compromised the trap results, and the baits were removed on day 4 before the end of the treatment rotation. The addition of endo-brevicomin to frontalín and turpentine has greatly increased trap catch of SPB in the southern U.S., and it appears to be a potent attractant for *Dendroctonus* bark beetles in Chiapas. The ratio of species collected has yet to be determined. Future studies will be attempted with traps located only in openings with a radius of 10m or greater. This requirement will affect the number of treatments and replications that can be utilized. Another complication is the blockading of the woods roads by the Park. The Park was placing concrete barriers on the roads to prevent access and reduce timber theft. Four-wheelers or walking will be required to set up future studies in the Park.

I returned to Tapachula on May 23, and Brian and I flew back to the U.S. on the 24<sup>th</sup>. We are awaiting results of the trap catch numbers and species composition. We are also planning the next round of trapping studies with Benjamin and Jorge.